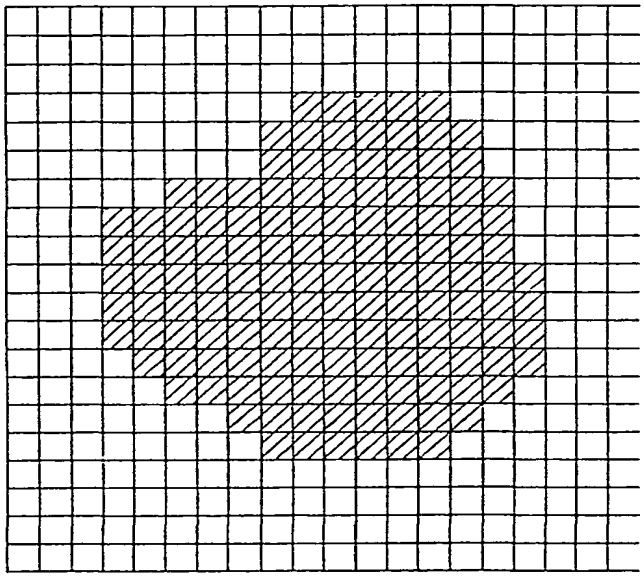
FIG. 1

(a) THREE-DIMENSIONAL BIT-MAP



(b) SOLID SHAPE DESCRIBING METHOD OF THE PRESENT INVENTION

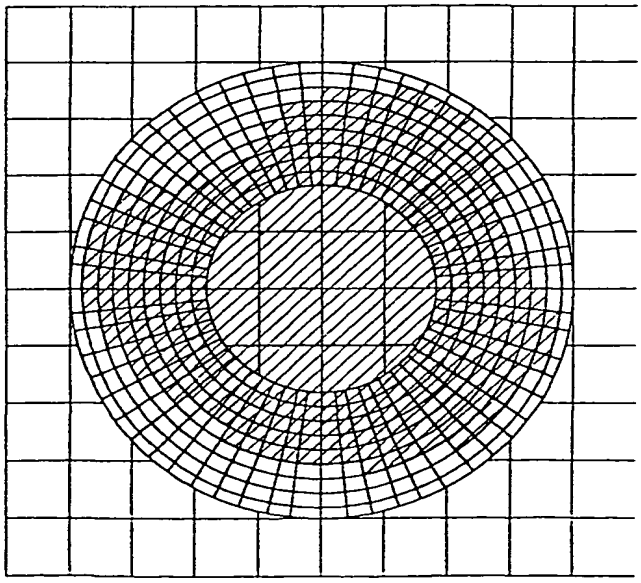


FIG. 2

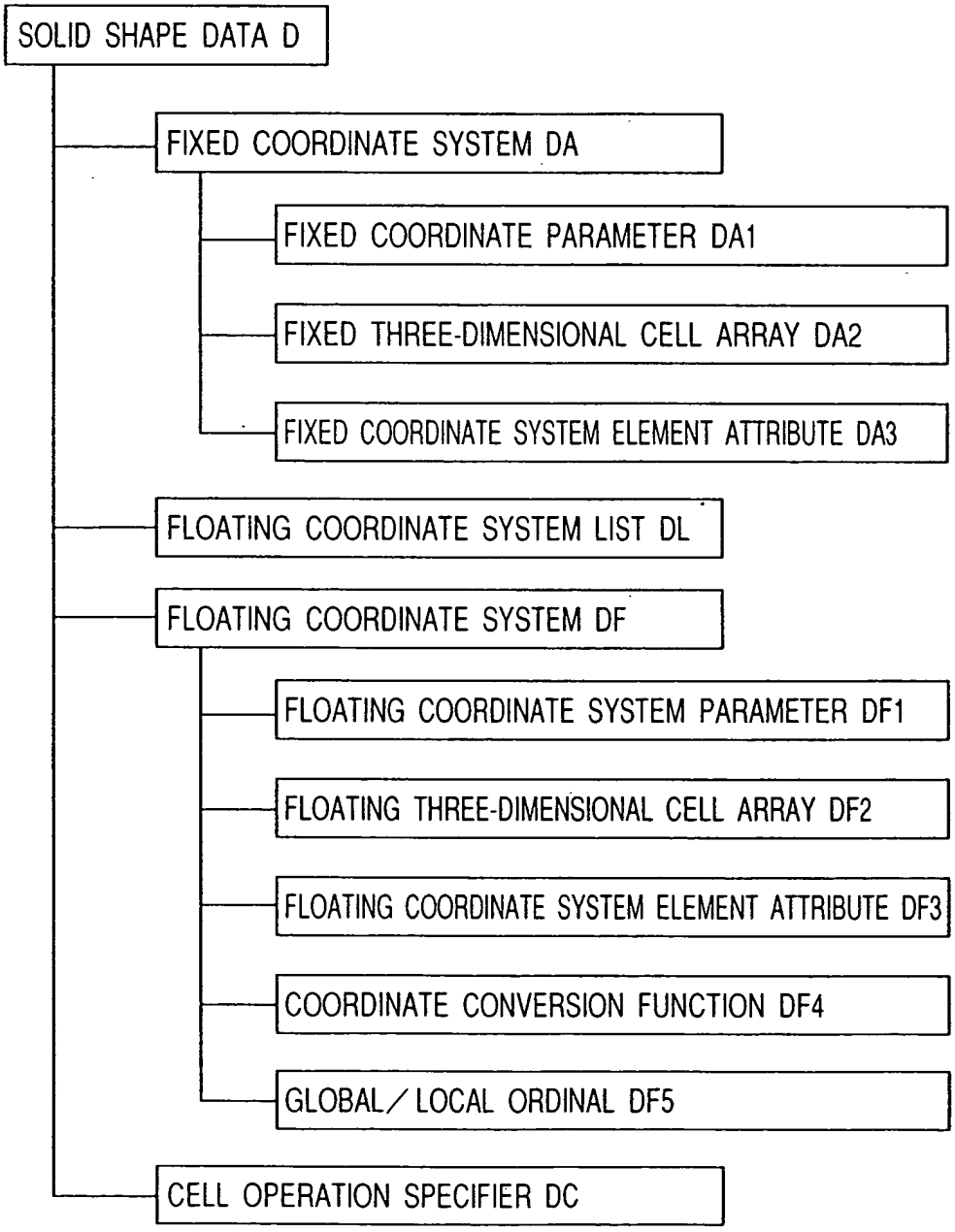

SOLID SHAPE DATA D
FIXED COORDINATE SYSTEM DA
FIXED COORDINATE PARAMETER DA1
FIXED THREE-DIMENSIONAL CELL ARRAY DA2
FIXED COORDINATE SYSTEM ELEMENT ATTRIBUTE DA3
FLOATING COORDINATE SYSTEM LIST DL
FLOATING COORDINATE SYSTEM DF
FLOATING COORDINATE SYSTEM PARAMETER DF1
FLOATING THREE-DIMENSIONAL CELL ARRAY DF2
FLOATING COORDINATE SYSTEM ELEMENT ATTRIBUTE DF3
COORDINATE CONVERSION FUNCTION DF4
GLOBAL/LOCAL ORDINAL DF5
CELL OPERATION SPECIFIER DC

FIG. 3

COORDINATE PARAMETERS

r	θ

THREE-DIMENSIONAL CELL ARRAY

1	1	1	1	1	1	1	1	1	1	···	1	1	1
1	1	1	1	1	1	1	1	1	1	···	1	1	1
1	1	1	1	1	1	1	1	1	1	···	1	1	1
1	1	1	1	1	1	1	1	1	1	···	1	1	1
1	1	1	1	1	1	1	1	1	1	···	0	1	1
1	1	1	1	1	1	1	1	1	0	···	0	0	0
0	0	0	1	1	1	1	1	0	0	···	0	0	0
0	0	0	0	0	0	0	0	0	0	···	0	0	0

COORDINATE CONVERSION FUNCTIONS

$X(r, \theta) = r \cos\theta$

$Y(r, \theta) = r \sin\theta$

SOLID SHAPE

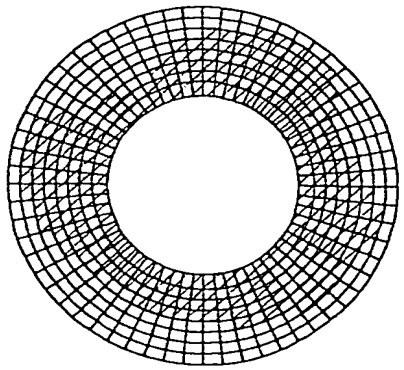


FIG. 4

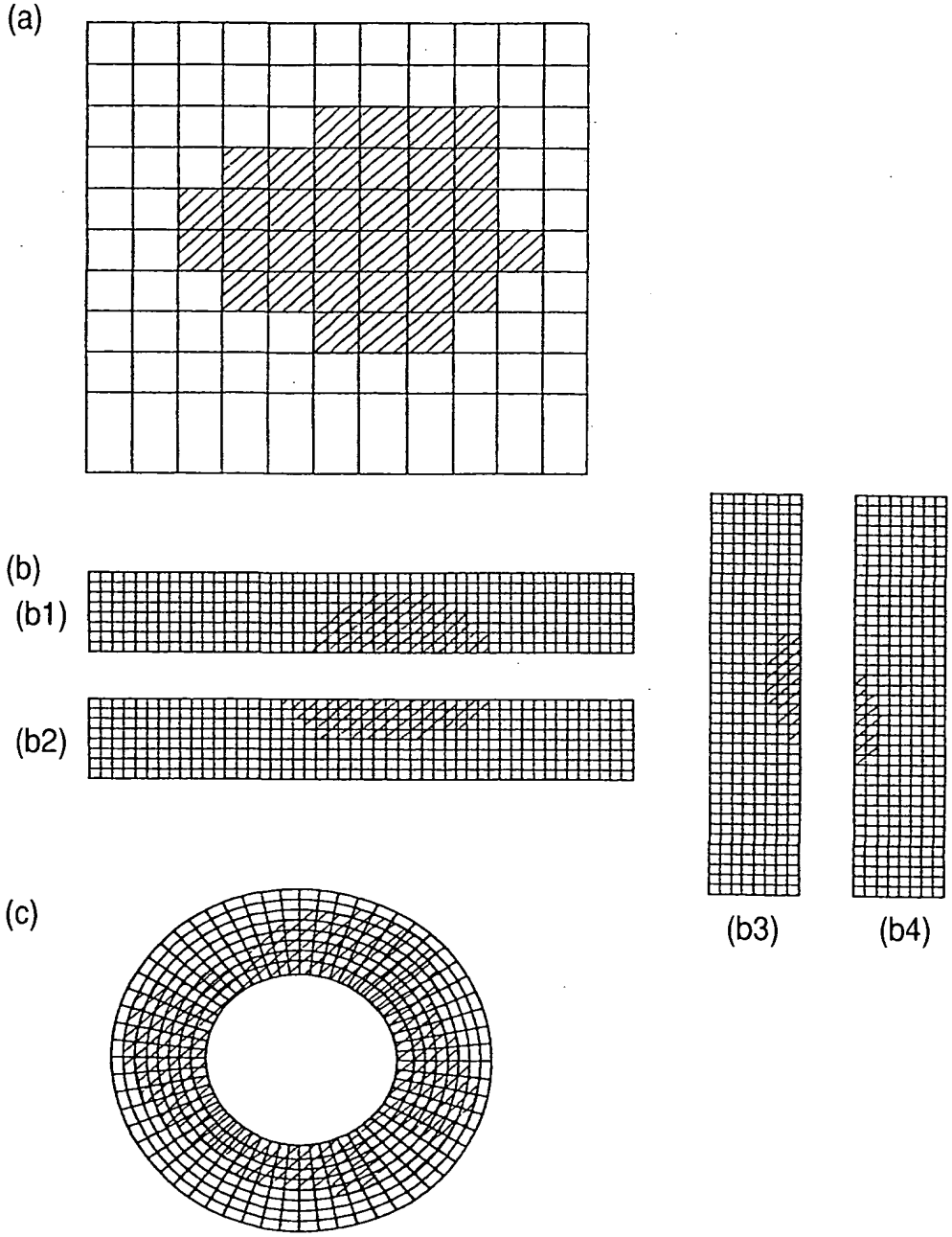
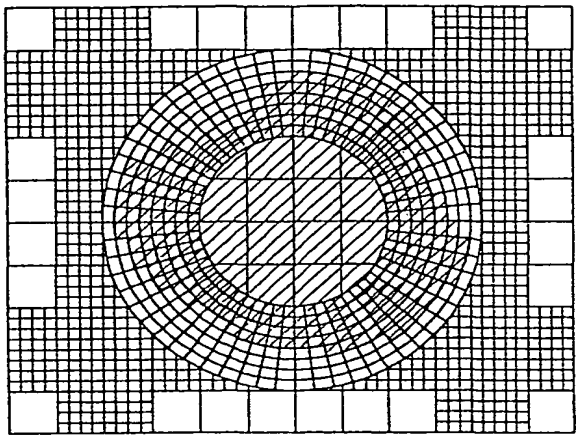


FIG. 5

(d)



(e)

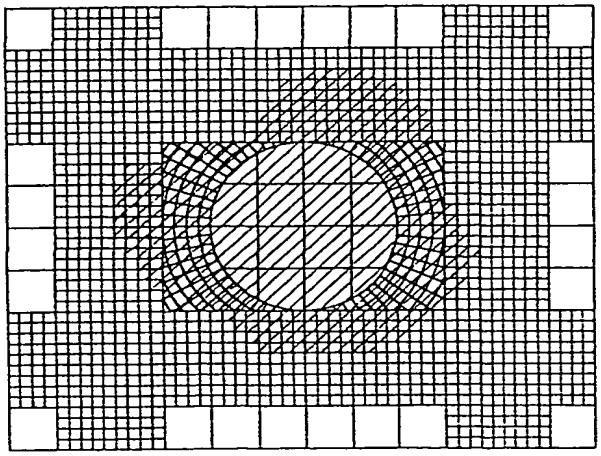


FIG. 6

(f)

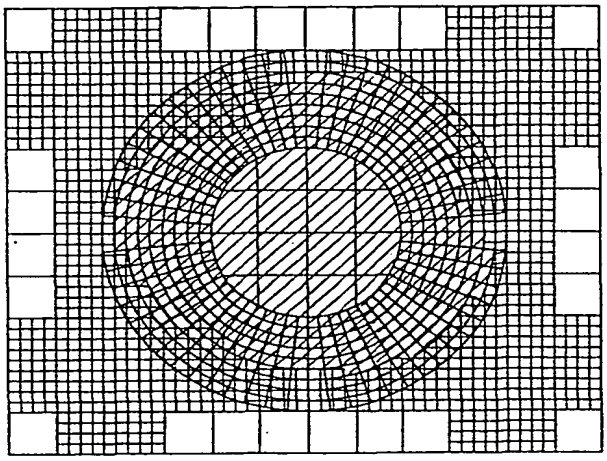


FIG. 7

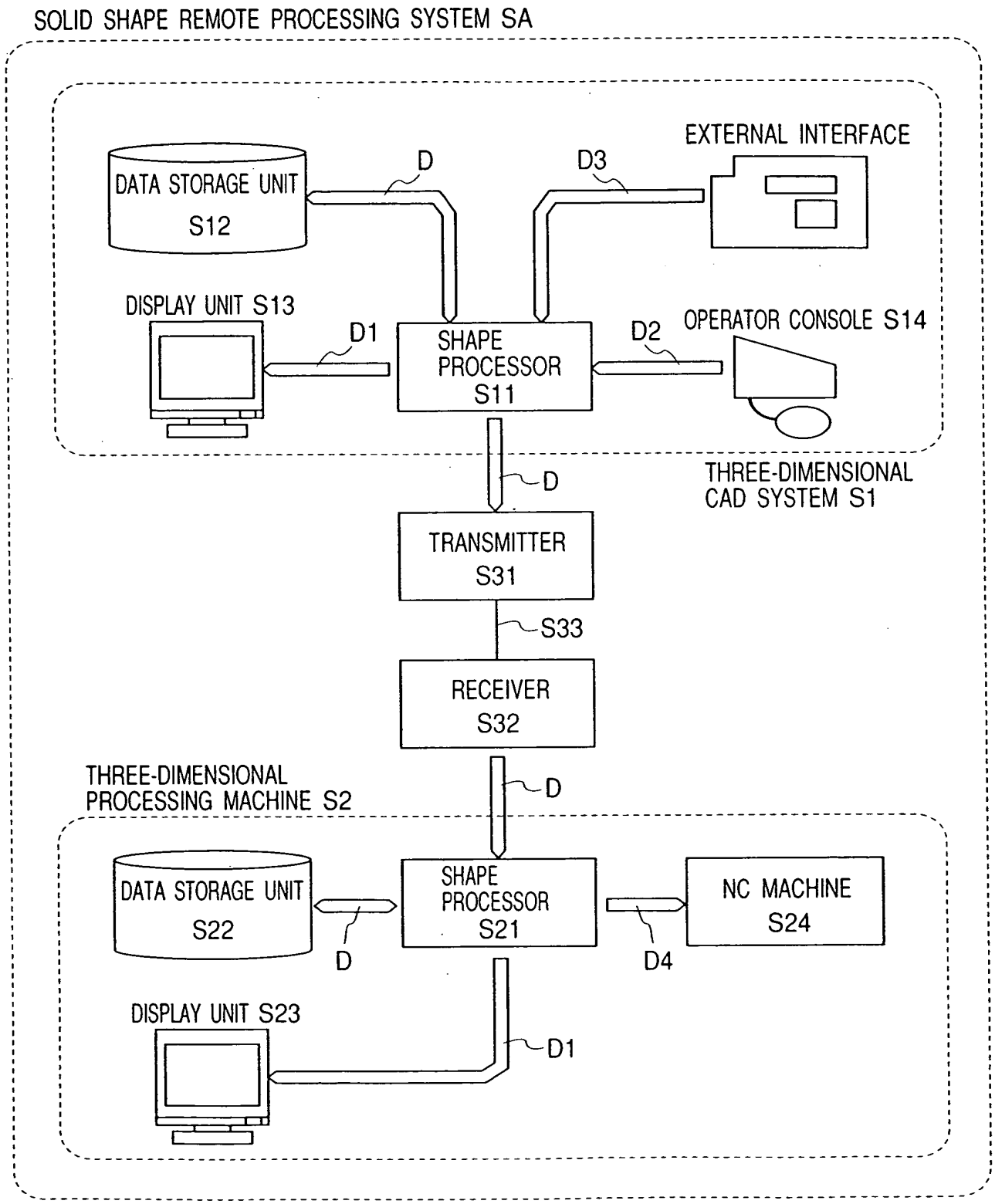

SOLID SHAPE REMOTE PROCESSING SYSTEM SA
EXTERNAL INTERFACE
DATA STORAGE UNIT
S12
D
D3
DISPLAY UNIT S13
D1
SHAPE
PROCESSOR
S11
D2
OPERATOR CONSOLE S14
THREE-DIMENSIONAL
CAD SYSTEM S1
D
TRANSMITTER
S31
S33
RECEIVER
S32
THREE-DIMENSIONAL
PROCESSING MACHINE S2
D
DATA STORAGE UNIT
S22
SHAPE
PROCESSOR
S21
NC MACHINE
S24
D
D4
DISPLAY UNIT S23
D1

FIG. 8

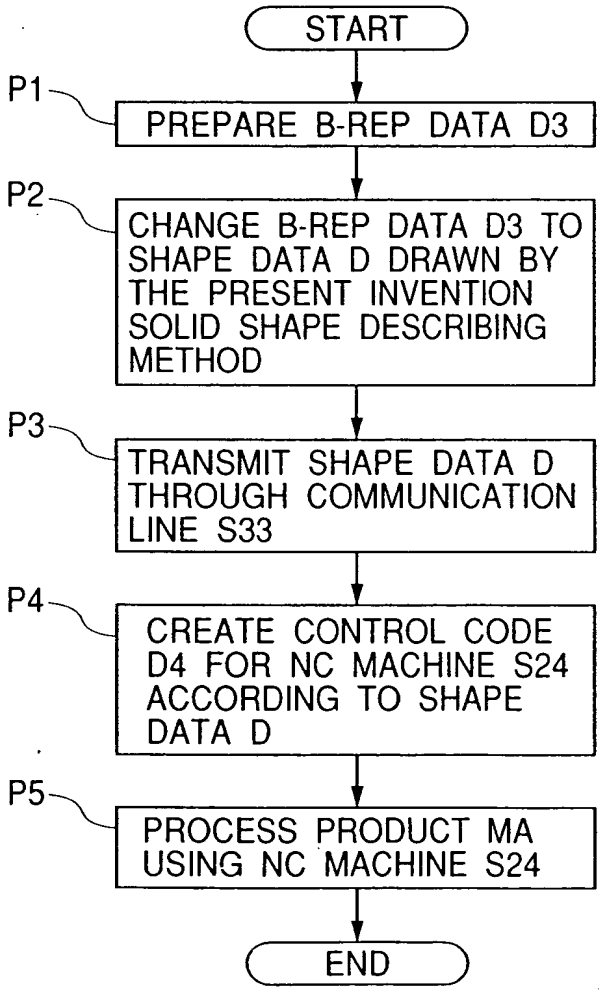

START
P1
PREPARE B-REP DATA D3
P2
CHANGE B-REP DATA D3 TO SHAPE DATA D DRAWN BY THE PRESENT INVENTION SOLID SHAPE DESCRIBING METHOD
P3
TRANSMIT SHAPE DATA D THROUGH COMMUNICATION LINE S33
P4
CREATE CONTROL CODE D4 FOR NC MACHINE S24 ACCORDING TO SHAPE DATA D
P5
PROCESS PRODUCT MA USING NC MACHINE S24
END

FIG. 9

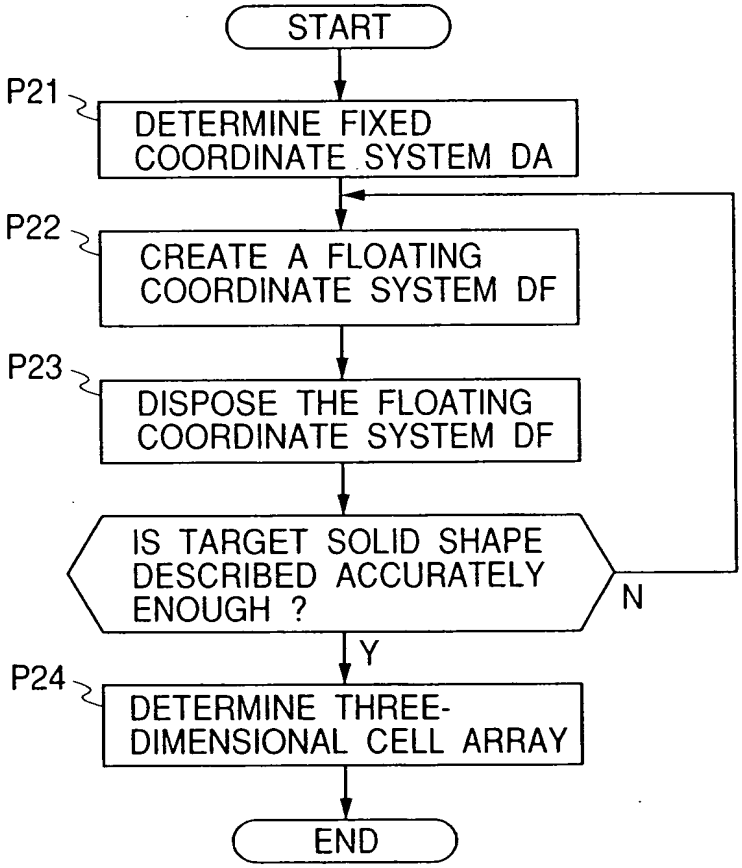

START
P21
DETERMINE FIXED COORDINATE SYSTEM DA
P22
CREATE A FLOATING COORDINATE SYSTEM DF
P23
DISPOSE THE FLOATING COORDINATE SYSTEM DF
IS TARGET SOLID SHAPE DESCRIBED ACCURATELY ENOUGH ?
N
Y
P24
DETERMINE THREE-DIMENSIONAL CELL ARRAY
END

FIG. 10

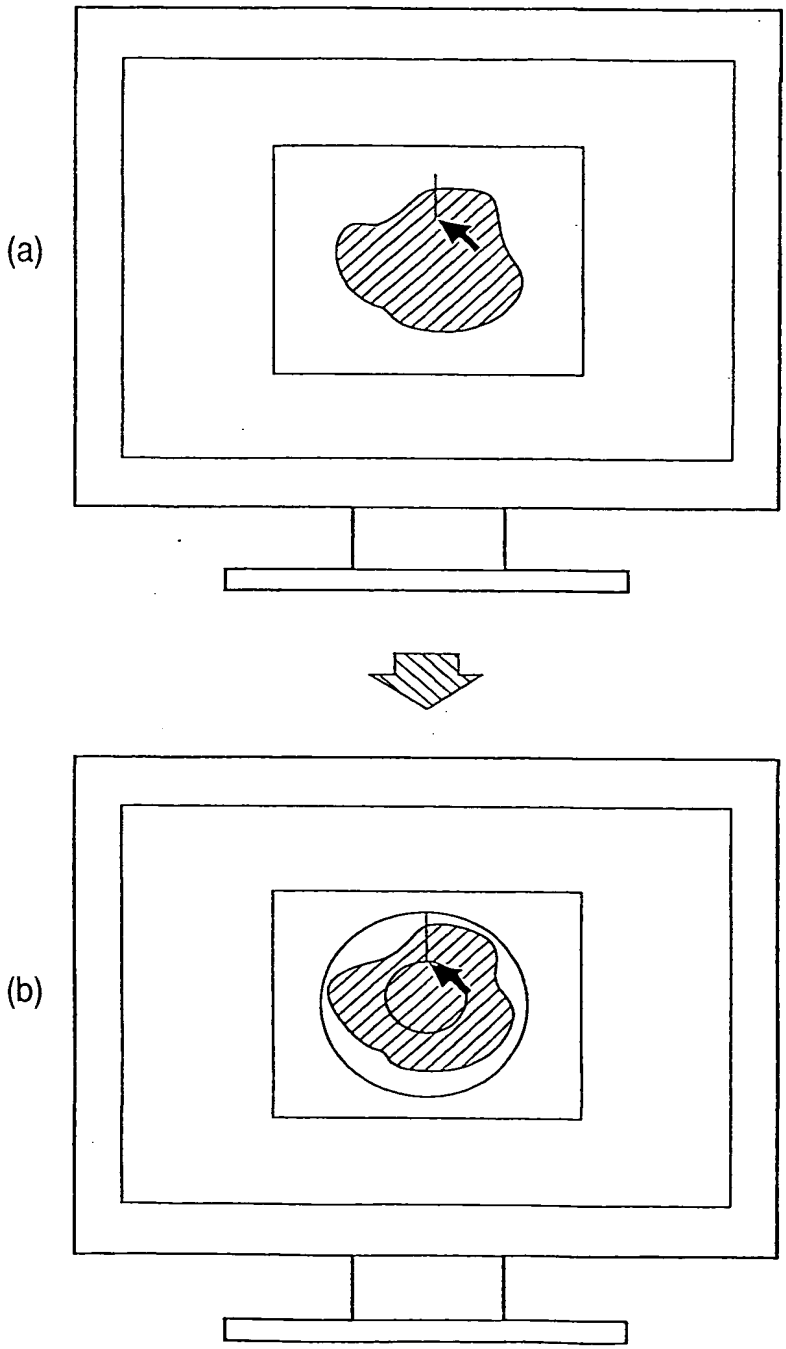
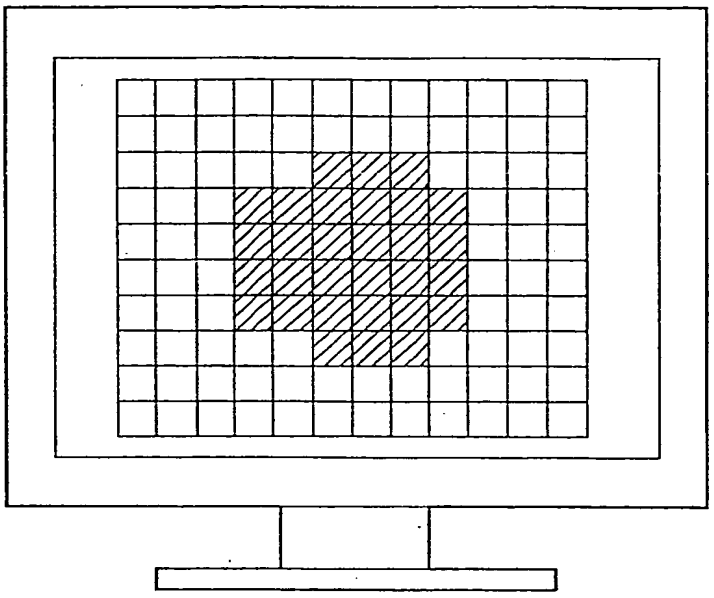


FIG. 11

(a)



(b)

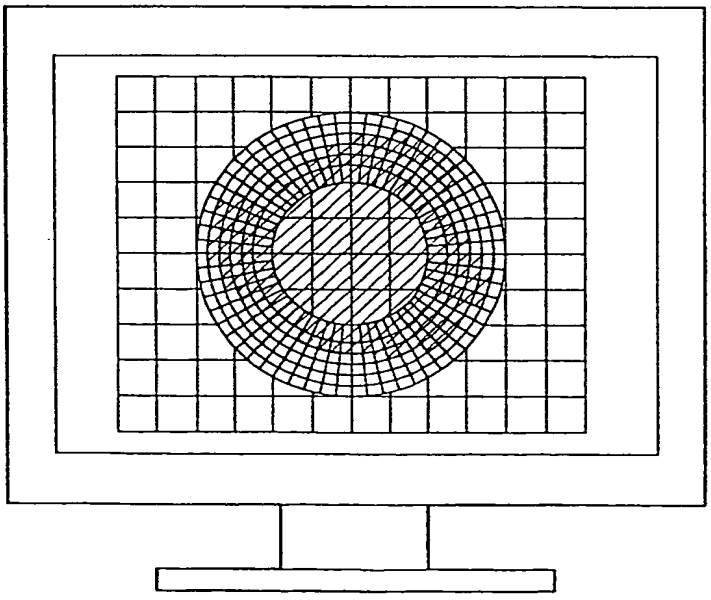
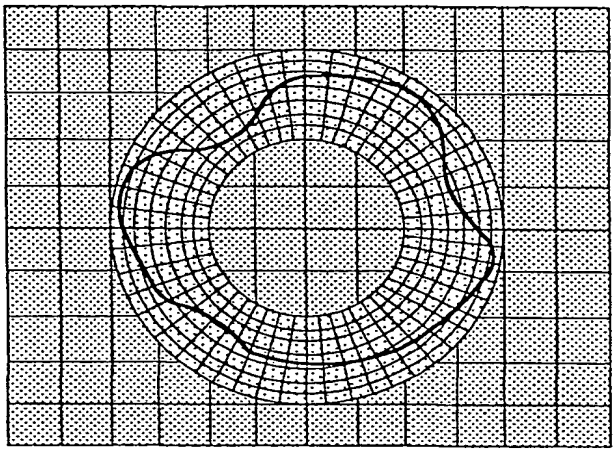


FIG. 12

(a)



(b)

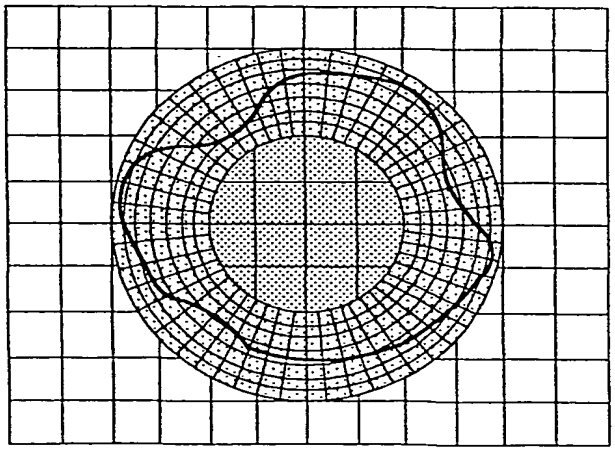


FIG. 13

(c)

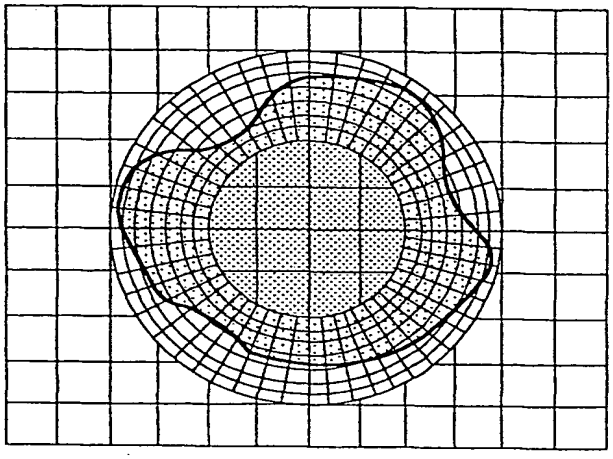


FIG. 14

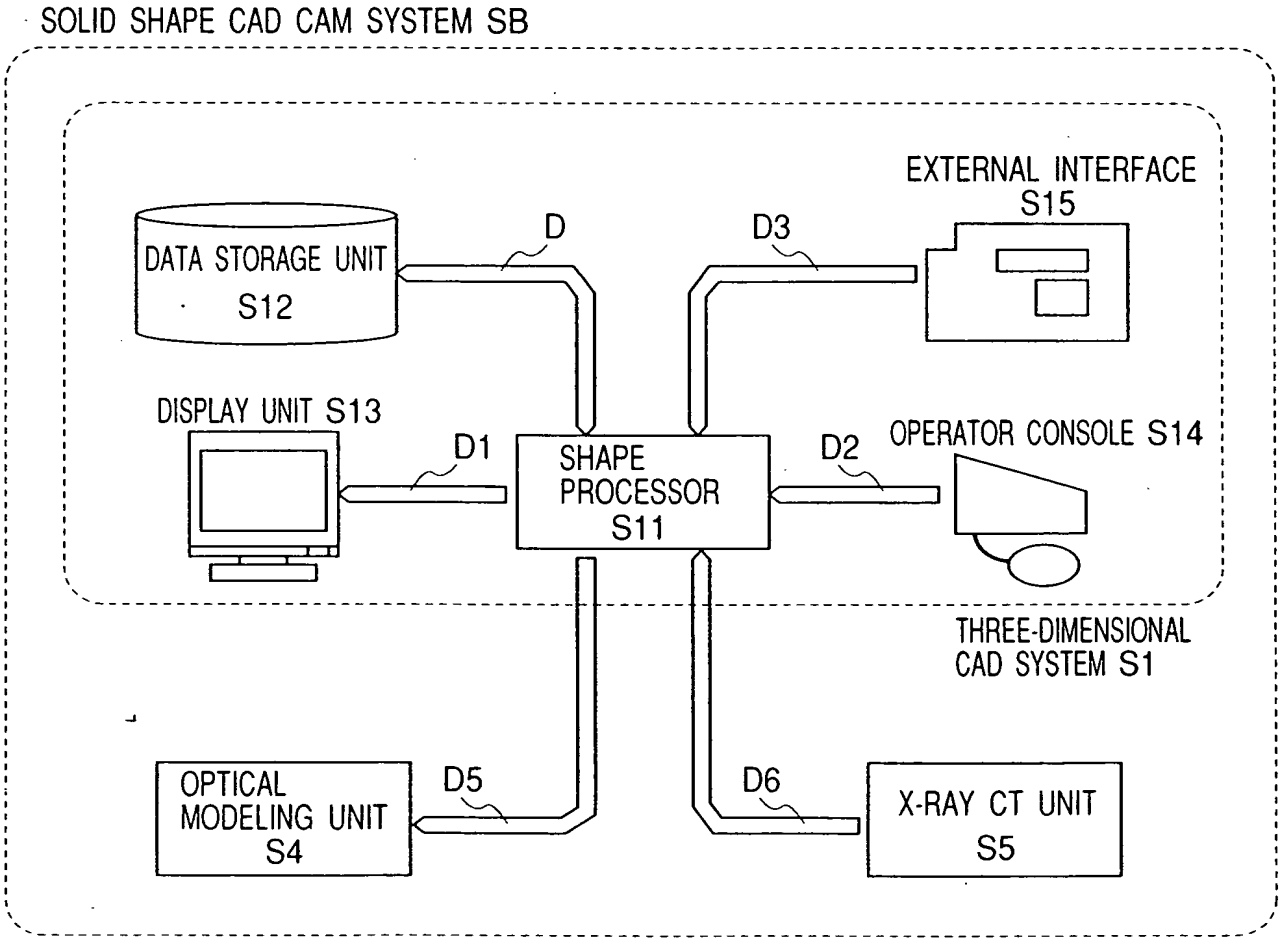

SOLID SHAPE CAD CAM SYSTEM SB
EXTERNAL INTERFACE
S15
DATA STORAGE UNIT
S12
D
D3
DISPLAY UNIT S13
D1
SHAPE
PROCESSOR
S11
D2
OPERATOR CONSOLE S14
THREE-DIMENSIONAL
CAD SYSTEM S1
OPTICAL
MODELING UNIT
S4
D5
D6
X-RAY CT UNIT
S5

FIG. 15

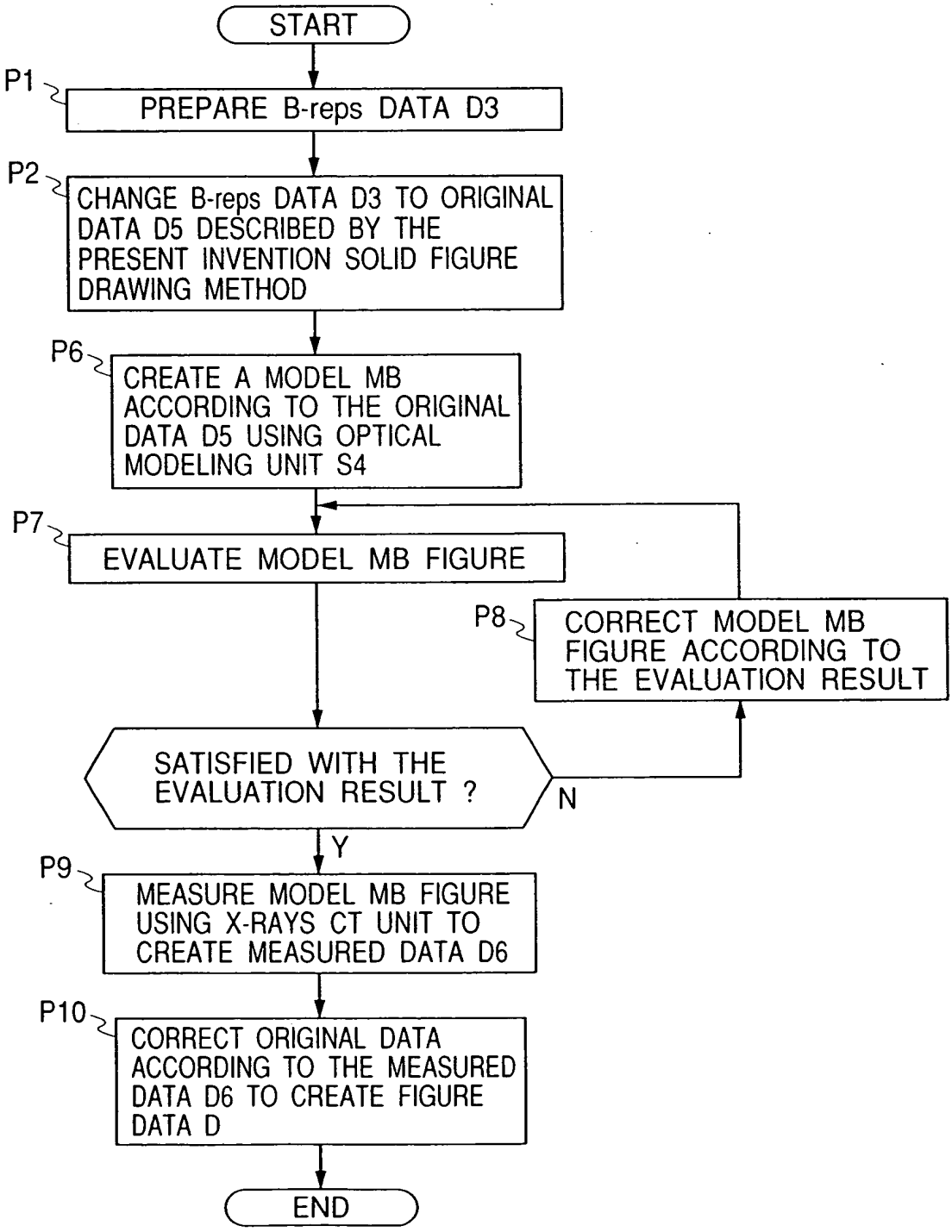

START
P1
PREPARE B-reps DATA D3
P2
CHANGE B-reps DATA D3 TO ORIGINAL DATA D5 DESCRIBED BY THE PRESENT INVENTION SOLID FIGURE DRAWING METHOD
P6
CREATE A MODEL MB ACCORDING TO THE ORIGINAL DATA D5 USING OPTICAL MODELING UNIT S4
P7
EVALUATE MODEL MB FIGURE
P8
CORRECT MODEL MB FIGURE ACCORDING TO THE EVALUATION RESULT
SATISFIED WITH THE EVALUATION RESULT ?
N
Y
P9
MEASURE MODEL MB FIGURE USING X-RAYS CT UNIT TO CREATE MEASURED DATA D6
P10
CORRECT ORIGINAL DATA ACCORDING TO THE MEASURED DATA D6 TO CREATE FIGURE DATA D
END

FIG. 16

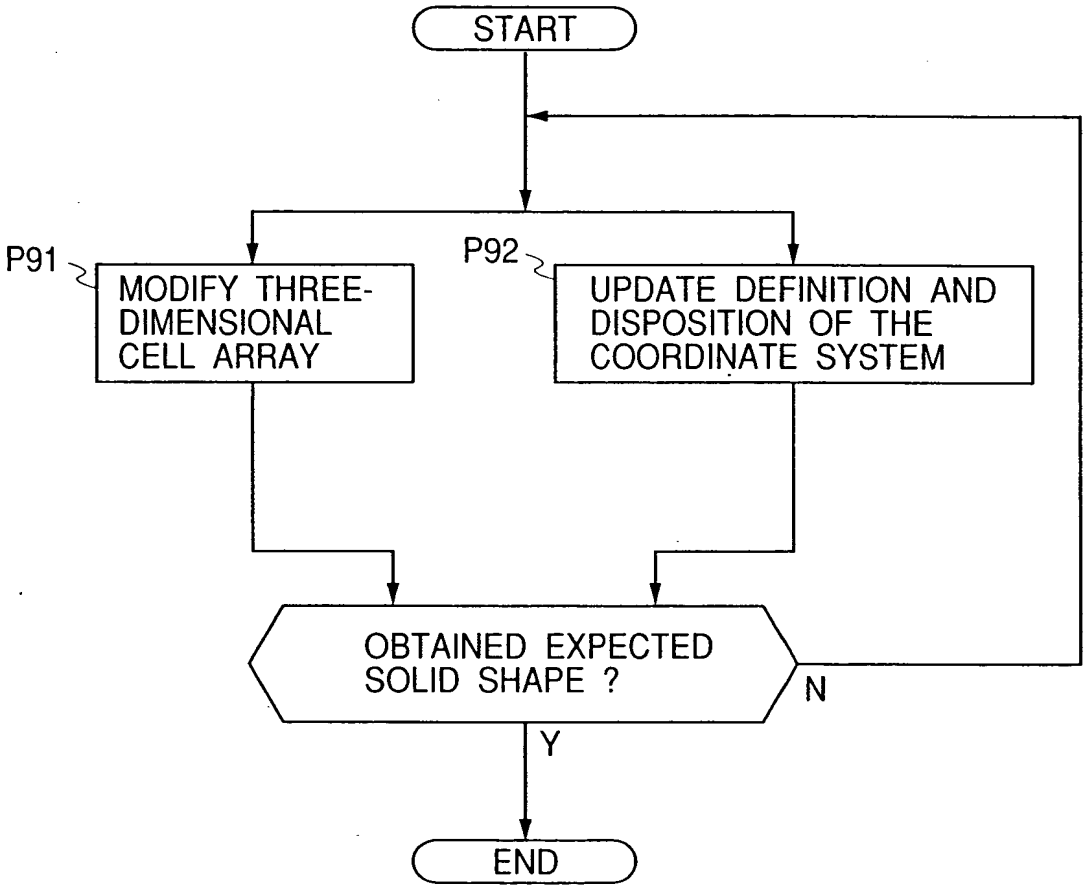

START
P91
MODIFY THREE-DIMENSIONAL CELL ARRAY
P92
UPDATE DEFINITION AND DISPOSITION OF THE COORDINATE SYSTEM
OBTAINED EXPECTED SOLID SHAPE ?
N
Y
END

FIG. 17

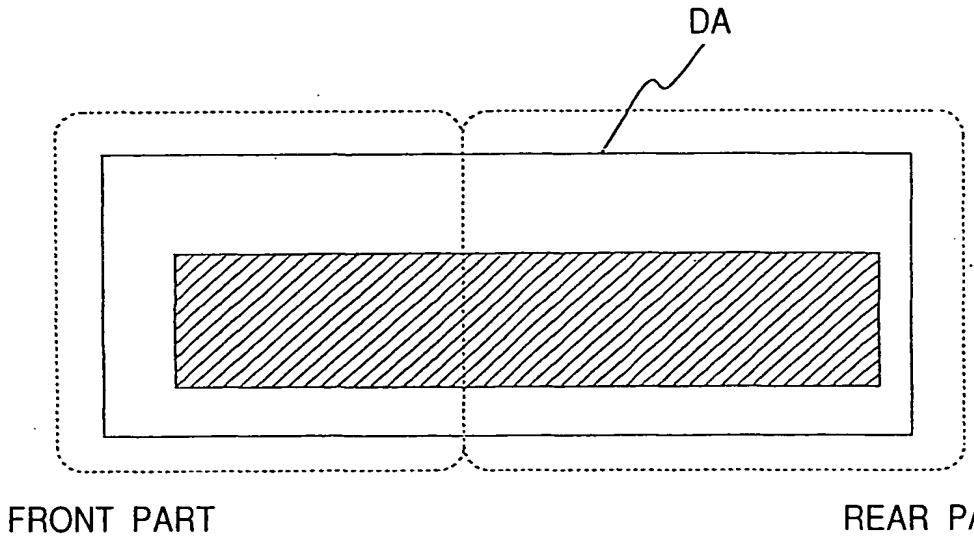


FIG. 18

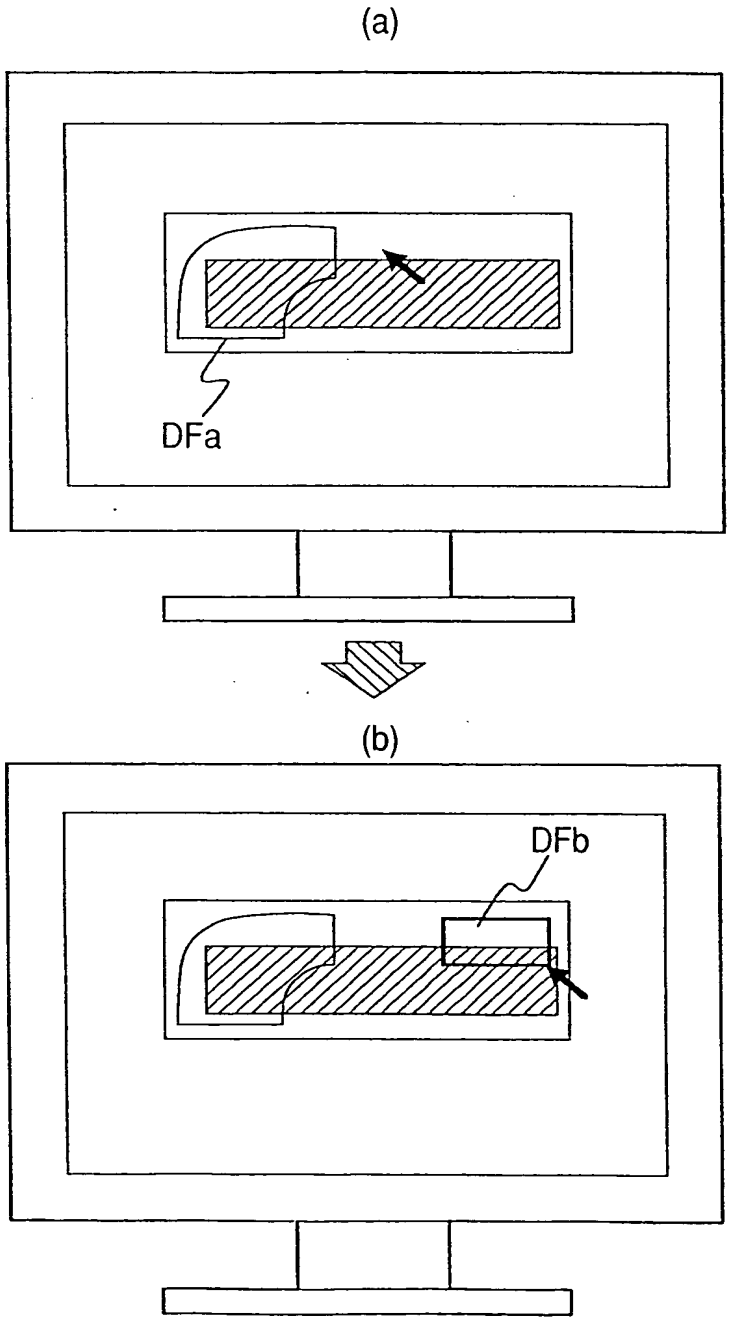


FIG. 19

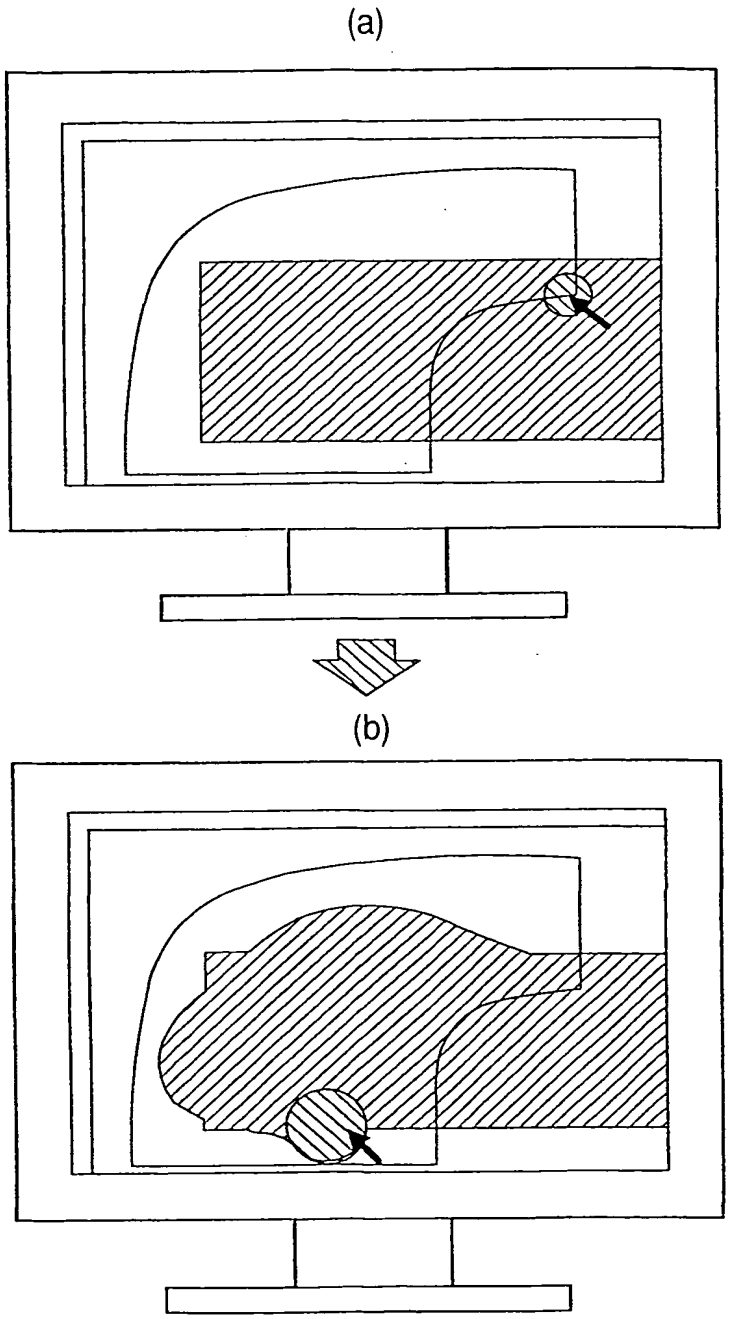


FIG. 20

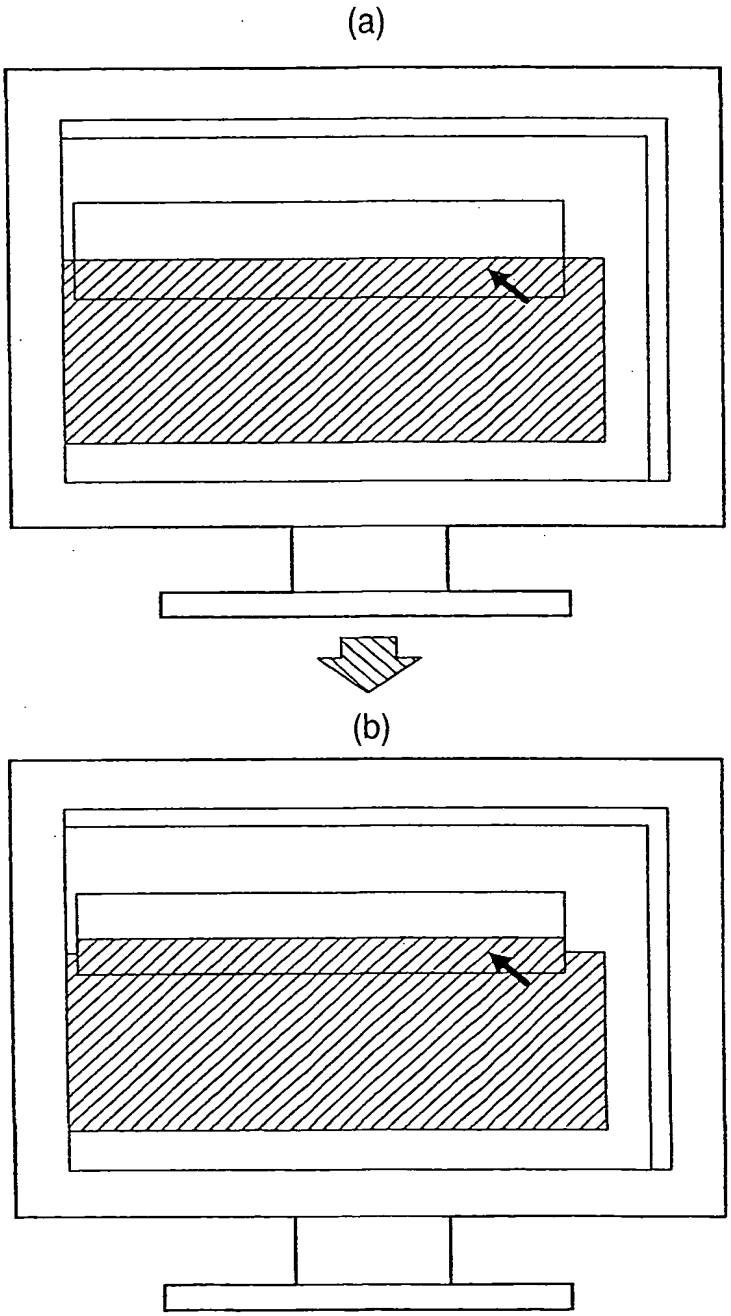


FIG. 21